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A taste of the technical cuisine: metals and other ingredients

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Abstract

According to cognitive linguistics, language has an experiential origin based on perception, sensory motor activities and our knowledge of the world. Our thought operates by establishing similarities, links and associations that enable us to talk about one thing in terms of another as shown in the example of love as a journey (Lakoff and Johnson, 1980). Metaphor and metonymy are conceptual and linguistic tools that make possible most of these cognitive operations. Since metaphor is an essential element of human communication, the discourse of specialised disciplines includes metaphorical mappings and numerous examples of metaphorical expressions, for example in economics, where business is mapped in terms of war (White, 2004; Herrera & White, 2000), electrotechnics with electrical components understood as couples (Roldán-Riejos in preparation) or in civil engineering where a bridge is conceptualized as a person (Roldán-Riejos, 2013). In this paper, the metaphors: WORKING WITH METALS IS COOKING/ TRABAJAR CON METALES ES COCINAR and METALS ARE CULINARY OBJECTS/ LOS METALES SON OBJETOS CULINARIOS are explored. The main aim is to show that the cooking metaphor is widely spread in the metallurgical domain in English and Spanish, although with different nuances in each language due to socio-cultural factors. The method adopted consists of analysing examples taken from the: *Bilingual Dictionary of Scientific and Technical Metaphors and Metonymies Spanish-English/English-Spanish*, a forthcoming and rigorously documented bilingual dictionary that sums up research on conceptual, linguistic and visual metaphor and metonymy in different areas of engineering (Roldán-Riejos and Molina, 2013). The present paper studies in detail English and Spanish cross-linguistic correspondences related to types of metals and processes. It is suggested that they reflect synesthetic metaphoric mappings. The exploitation of cognitive conceptual metaphor in the ESP classroom is lastly recommended.

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1. Introduction

Metaphor and metonym reflect mental cognitive mappings and figurative uses of language. In engineering discourse the presence of metaphor can be easily traced and usually responds to experiential patterns (see Cuadrado and Durán, 2013 in Geology; Robisco, 2011 in Aeronautics, Roldán-Riejos, 2013 in Civil Engineering). To talk about technical processes, methods or states, apparently unrelated domains are likely to interact so that projections from one domain to the other emerge. In the case of metals, why projections from the cooking, culinary metaphor? A possible general answer applicable to English and Spanish is that these two domains have in common the various thermal operations needed to transform matter. As a result a significant part of metals mappings are understood in terms of taste, touch and cooking. This paper aims to explore these salient metaphorical mappings in the domain of manufacturing metals and show that they are likely to borrow from cooking in examples as *heating metals in oven/furnace, baking, roasting, rolling* and generate conceptual networks and linguistic expressions. If addressed in terms of conceptual blending (Fauconnier and Turner, 2002), the cognitive experience of cooking (*heating/cooling, frying, melting* etc.) is transferred to another thermal operation that transform raw material into a finished product (metal production). In the cognitive topology these two domains and others referred to taste and touch senses interact, fuse and give rise to an emergent

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space. When the metaphor is compared at a linguistic level in English and Spanish, some variations are observed. In Spanish domain interaction tends to be more productive covering basic tastes and flavours: *dulce* (sweet), *semidulce* (semisweet), *agrio* (sour), *ácido* (acid). It also entails diverse “cooking” end results: *recocido* (annealing); *revenido* (tempering); *endurecido* (hardened). In turn, English favours semantic configurations of touch and texture (*soft*, *mild*, *hard*) as well as different temperature processes (*quench*, *melt*, *pickle*, *glaze*).

The variety of cognitive configurations within similar domains in both languages reflects the superimposition and cross-sensorial transfer of taste, touch, smell and sight that work synesthetically and bidirectionally in the metal and cooking domains. The main aims of this study are:

- to explore the conceptual mappings of the source domains (cooking/taste/touch) and the target domains (metal types/metal processing);
- to focus on the synesthetic basis of the metaphors;
- to study these domains cross-linguistically (Spanish/English);
- to point out socio-cultural variations and nuances and
- to establish their pedagogic potential for the LFE classroom.

The first part looks at the methodology adopted to explore the conceptual projections and linguistic examples. The next section deals with synesthetic mappings, their potential origin and contrastive analysis in English and Spanish. This is followed by some vocabulary target specific tasks to exploit in the LSP classroom. Finally, some concluding remarks are pointed out.

2. Methodology

The conceptual metaphor WORKING WITH METALS IS COOKING was identified by analysing examples extracted from a general corpus of technical terms targeted for the *Bilingual Dictionary of Technical and Scientific Metaphors and Metonymies Spanish-English/English-Spanish* (forthcoming). Two main criteria were adopted for the exploration of entries: collocational and statistical.

Technical linguistic terms tend to appear in binary groups or clusters, consisting of two or more words. These groups can be identified as collocations. Collocations are common in technical language, and at times their meaning is metaphorical. They have been defined as lexical association (Biber et al., 2000) consisting of two words “in a binary relationship” (Williams, 2001:63). Collocation patterns are pairings or lexical clusters that tend to co-occur together, each part usually reinforces the meaning of the whole set, referred as “collocational network” (Williams, 2001:68). According to Halliday, 1995 collocations can be textual cohesive and each discourse community tends to develop specific ones. The collocates analysed in this study are formed by holistic groups where the metaphoric load is evenly distributed. They were sifted through corpora driven data (ANT CORD programme) and analysed to establish the presence of conceptual metaphor. This examination pinpointed a number of metaphoric synesthetic mappings. The Spanish collocate, “hierro semidulce” (*semisoft iron*), for example, illustrates the synesthetic and metaphoric mapping fusion between iron as a metal with the apparently unrelated sweet taste. *Soft copper* is an example of superimposition of the metal texture and the sense of touch.

As to statistics, 44 Spanish collocates out of 96 metal types (42, 4 %) make reference to cooking, tastes and flavours and 39 English counterparts (37, 4 %) are related to cooking, touch/texture and tastes. Table 1 exemplifies a sample of the total corpus.

Table 1. Sample of the corpus Spanish-English.

Spanish collocates	English collocates
Acero ácido	Acid steel
Acero agrio	Perished steel
Acero al carbon calmado	Carbon-killed steel
Acero ampollado	Blister steel
Acero asado	Roasted steel
Acero calmado	Killed steel
Acero calmado con aluminio	Aluminium killed steel
Acero calmado de calidad	Fully killed quality steel
Acero cementado	Hard-faced steel
Acero con costra	Set over steel

3. Metaphoric Synesthetic Mappings

This paper explores prevailing mappings in the domains of cooking and metals manufacturing in English and Spanish and their linked linguistic inventory. If we examine the cognitive mechanism underlying this metaphoric association, we can talk of synesthesia. Synesthesia is a cross-sensory phenomenon that involves perceiving a stimulus across different sensory modalities (intersensory development). An example is “shrill colour” that unites attributes from the auditory and visual modes. In Spector and Maurer’s words (2009:185): “there is a systematic way in which sensory information translates across modalities throughout development that influences what we pick up from the environment”. Historically, synesthesia has been mainly investigated by psychologists as a physiological phenomenon affecting a part of the population (synesthetes), although more recent views encompass weaker forms of synesthesia (synesthetic metaphor) induced by cognitive and cultural factors and manifested in language (Simmer, 2012; Spector and Maurer, 2009). Synesthesia is related to perception and language, and like metaphor can be a figurative use of language being its use in literature very frequent, especially in poetry. Cohen-Kadosh and Terhune, 2013 favour this view encompassing sensory and non-sensory synesthesia. Other authors posit a distinction between synesthesia and “cross-modal correspondences” arguing that the latter are malleable and acquired (Deroy and Spence, 2013: 643). From conceptual metaphor theory, the co-activation of synesthetic mappings is based on cognitive and physiological processes (Boieblan, 2013: 44, 161). Yu (2012:1288) claims that synesthetic metaphors are grounded in our bodily and cultural experiences in the world. Synesthesia is very common in modern cooking. Chefs seek to fuse in a creation the olfactory, the visual, the flavour and the tactile senses. Aduriz et al., 2012 claim the importance of visual and tactile perception in preparing and cooking recipes. In their work, they aim to integrate “mineral and vegetable” food qualities by producing a cooked edible artifact (actually a type of potato) that may be visually perceived as a river stone. Texture is aimed to be synesthetically perceived from a multisensory perspective through the eyes and the senses of taste and touch. On the other hand, cooking is a cultural and experiential phenomenon and so is manufacturing metals. Cooking is culture specific, every culture elaborates and processes food differently and in accordance the choice of lexical repertoire presents linguistic variations. Typology responds to the characteristics of metal processing taking a cultural activity like cooking as a vehicle. Although similar categorizations surface at the superordinate level in English and Spanish in the metaphor WORKING WITH METALS IS COOKING they by no means correlate at the basic level. In Spanish, the texture of the metal appears fused with flavours such as *sweet*, *semisweet*, *sour*, etc. (figures 1 and 2). According to the metal, *mild* and *soft* go with *sweet* (“dulce”) and *hard* goes with *sour* (“agrio”), *semisweet* with *semisoft*, etc. This merely applies to physical appearance/shape and has no axiological value. However, as Khajeh and Imran, 2012 point out in their study of English and Persian cuisine, sweetness may be perceived as positive and negative depending on the culture.

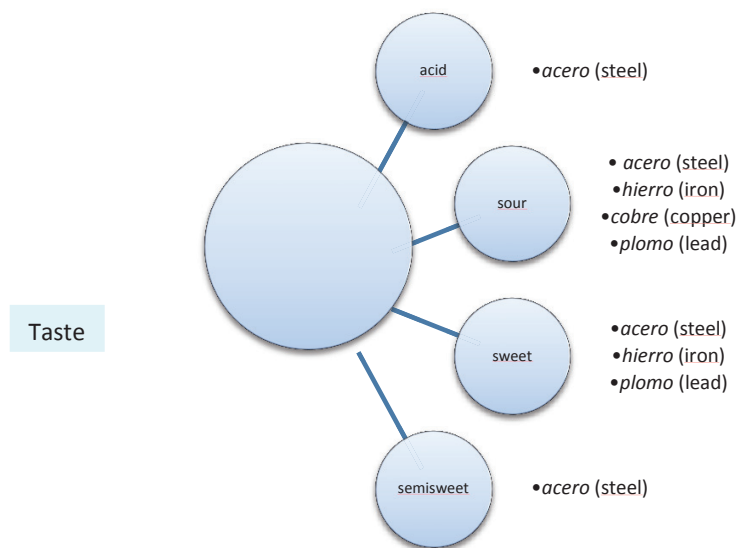


Figure 1. The “taste” of metals (Spanish).

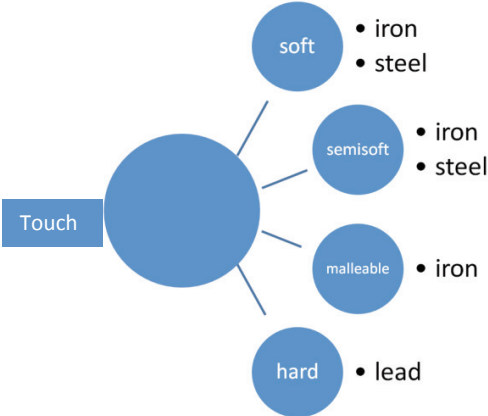


Figure 2. The “touch” of metals (English).

The two figures show the two prevailing mappings concerning metal types and reflect the interconnection of ‘taste’ and ‘touch’ in English ferrous metals. The unity of these senses forges a new multisensory meaning.

4. Historical Background

The fact that metal work evokes culinary preparations seems intriguing enough to look for historical reasons of this association. A plausible answer is ancient alchemists’ concoctions. Alchemy was a type of science in ancient and in medieval times that sustained the aspiration that metals like iron and lead could be turned into gold or silver. From ancient history, alchemists had recipes listing ingredients or techniques by which they made metals (Principe, 2013). The basis for many of the recipes was to introduce to base metals properties which the metals lacked and therefore to transmute them. Alchemy has been considered the forerunner of chemistry. Alchemists created new alloys, manufactured acids and pigments and invented apparatus for distillation. Scholars like Aristotle, Aquinas or Newton wrote about or practiced alchemy. Aristotle drew an analogy between the human body “cooking” food during digestion and the actual cooking of food through different process like boiling. Medieval writers extended this analogy to “cooking” metals and transforming some of them into precious exemplars. In addition, Aristotle listed four primary taste qualities: *sweet, salty, sour, and bitter* in *De Anima* and interestingly associated the senses of touch and taste. Thus for Aristotle the sense of taste “is a type of touch” “for it apprehends by contact”. “Clearly then, taste is not the same as touch but is somehow founded on touch” (II.x.504-6).

5. Contrastive Analysis

The more significant features in the cross-linguistic analysis between Spanish and English is that mapped correspondences are asymmetrical (there is no one-to-one correspondence) and are seldom constrained. For example, the overarching metaphor METALS ARE CULINARY OBJECTS is branched into two submappings: METALS ARE TASTES (prevailing in Spanish and illustrated in table 2) and METALS ARE TEXTURES (in English as seen above). Yet these mappings can also interlink occasionally as in English *acid steel, semi-mild steel, liquation cake* and Spanish “acero con alma suave” (soft-centred steel), “acero extrasuave” (dead mild steel), “acero suave” (mild steel). “cobre bruto” (coarse copper).

Table 2. Cross-linguistic use of tastes in metals.

TASTES	SPANISH	ENGLISH
ACID	Acero ácido	Acid steel
SOUR	Acero agrio	Perished steel
	Cobre agrio	Dry copper
	Hierro agrio	Short iron
	Plomo agrio	Hardlead
SWEET	Acero dulce	Mild steel
	Hierro dulce	Soft iron
	Plomo dulce	Refined lead
SEMISWEET	Acero semidulce	Semisoft steel

This flow of mapped correspondences is equally represented in the mapping WORKING WITH METALS IS COOKING which includes various preparation processes for metals in both languages as shown in table 3.

Table 3. Metals' cooking presentations in Spanish and English counterparts.

PRESENTATION	METALS (SP)	METALS (EN)
ROASTED	Acero asado	Roasted steel
RAW	Cobre crudo	Hard-drawn-copper
FRIED	Cobre/acero frito	Sintered copper/Powdered steel
RINSED	Acero/hierro colado	Cast steel
BAKED	Cobre recocido	Soft copper
LIQUID	Acero líquido	Lively steel
SETTLED	Acero reposado	Killed steel
WARM	Acero templado	Quench-hardened steel
POWDERY	Cobre granulado	Mossy copper
LIGHT	Petróleo ligero	Straw/Light oil
LAYERED	Pan de Hierro/cobre/plomo/oro/plata	Liquation cake/Pig lead/gold/silver leaf/foil
IN SHELL	Cobre en cáscara	Cement copper
CRUSTED	Acero con costra	Setover steel
MELTED	Acero fundido	Cast steel

Although Spanish cooking correspondences are richer and more clearly defined, the mapping is not inactive in English, as illustrated by “roasted”, “powdered”, “cake”, “set over”. The existing differences are likely due to cultural grounds. After all, ways of cooking and cooking ingredients are culture specific, every culture has their own peculiarities and this is reflected in different languages like English and Spanish. In fact the choice of lexical repertoire varies in each language as the cross-cultural study of English and Persian culinary metaphors shows (Khajeh and Abdullah, 2012).

Table 4. Cross-linguistic contrast of metal mappings processing and cooking.

METALS		COOKING	
Pickling	Decapar	Pickling	Encurtir, Aliñar
Heating/Cooling	Calentar/Enfriar	Heating/Cooling	Calentar/Enfriar
Quenching	Templar	-----	-----
Dipping	Bañar/Sumergir	Dipping(sauce)	Mojar (salsa)
Rolling	Laminar	Rolling	Rebozar, estirar
	Lubricado, engrasado		Bañado en aceite
Oiled		Oiled	
Sintering	Sinterizar	-----	-----
Annealing	Templar	-----	-----
Glazing	Barnizar	Glazing	Glasear
Melting	Fundir	Melting	Fundir/derretir
Flame hardening	Templar a la llama	Flambé	Flambear

Table 4 includes a cross-linguistic comparison between metal manufacture and cooking mappings in English and Spanish. For example, the culinary preparation *pickling* in English has a technical counterpart in Spanish (strip), and likewise *rolling* (laminar) and *glazing* (varnish). The productive nature of some of them is reflected in these examples: *Pickle Brittleness* (the brittleness induced in steel when pickled in dilute acid for the purpose of removing the scale); *Pickle-Only* (a coil which is to be cleaned but not coated); *Pickled* (steel that has gone through the pickler operating unit to remove mill scale or oxide; Pickled Slit Width (width of the coil after it has been side trimmed at the pickler); *Pickler* (an operating unit that removes iron oxide from a hot rolled product by immersion into a hydrochloric or sulfuric acid solution.) *Pickling Liquor* (the waste resulting from the pickling process. The liquor consists of acid and water).

We advocate explicit classroom attention to these synesthetic metaphors, on the grounds that metaphors are an integral part of language, and that learning common metaphorical patterns can simplify the acquisition of vocabulary and learning grammar.

6. Conclusions

We can conclude that the cooking metaphor is widely spread in the metallurgical domain in English and Spanish, although with different nuances in each language due to socio-cultural factors. Whereas Spanish tends to synesthetically evoke the sense of taste and a broader range of culinary preparations, the sense of touch and texture prevails in English. The lack of one-to-one correspondence does not constrain borrowing between mappings. We suggest that students might find it easier to learn these English synesthetic metaphors if they are encouraged to think about Spanish metaphors and compare them to use in English. We

have shown that the trends of synesthetic metaphors are built and evolve in the same manner as for other metaphors, through linguistic and cultural processes; and these trends and universals can be investigated from a linguistic contrastive standpoint.

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